Big Data, Big Applications

Interview with LANDFIRE "Pioneer" Dave Cleland

Dave Cleland is a landscape ecologist with the USDA Forest Service, Forest and Range Management and Vegetation Ecology, Washington Office. He began working for the Forest Service in 1978, and has held positions as a Forest Soil Scientist, Forest Ecologist, Research Liaison, Regional Ecologist, Research Ecologist, and Assistant National Vegetation Ecologist over the course of his career.

Dave received his PhD from Michigan State University with specialties in forest ecology, soils, silviculture, and quantitative methods, and currently serves as the team lead for the agency's Terrestrial Condition Assessment.

When did you first become affiliated with LANDFIRE or use LF products?

I was invited to a meeting held in Ohio when LANDFIRE first started (early 2000's), where I learned about biophysical settings (BpS) and state-and-transition modeling. Wendel Hann and Jim Menakis were among the instructors. Later, I had the chance to work with the LANDFIRE contingent writing BpS descriptions for the Lake States, and afterward providing GLO data and iterative reviews of their BpS mapping. I was always impressed with the caliber of the scientists doing the work.

You have been doing regional/national data work for decades. From when you began, what changes have you seen, for better and worse?

Additional LANDFIRE products have come online, which is a good change. For example, a national team evaluating short-term forest restoration prospects is looking at the crown height and density grids right now. We're also using LANDFIRE's fire regime groups to identify where fire might be the preferred restoration treatment, and where a combination of mechanical and pyric techniques may be necessary given fuel conditions.

When you are assessing large datasets for potential use, what do you look at? Why use LANDFIRE?

LANDFIRE has the most consistent and I think best data available nationally on fire regimes, biophysical settings, and vegetative departures and dynamics. The data have been used extensively in a recently completed national assessment of all National Forest Service lands in the conterminous US. We evaluated nine indicators

and 26 metrics including wildfire hazard potential, uncharacteristic wildfire frequency or severity, vegetation departure, and missed fire cycles using LANDFIRE data as baselines. We coarsened the BpS layer to assist in delineating landscape analysis units used in the assessment, where regional maps of land type associations weren't available. In all, 10,000 land type associations (LTAs) or LTA approximations were mapped and assessed, the average size of these landscape ecosystems is 20,000 acres.

Tell us about your interest in the ecological impacts of historic vs. current fire regimes.

I think that understanding how systems functioned and were affected by natural disturbance regimes is critical to maintaining or restoring natural resources. For example, the enormous problems with wildfire hazard potential and insect and disease risk in the west are due in part to altered fire regimes following a century of fire suppression. In places, fire exclusion has altered fuel complexes (forest densification and ingrowth, landscape-level fuel patterns), which has changed the natural fire regime in a bad way, e.g., former low severity surface fire regimes have become severe crown fire regimes. Densification has also altered moisture balance, stressing trees and making them less resistant to insects and disease. Understanding historical conditions and disturbance dynamics of ecosystems, and mimicking spatial and temporal patterns in management can help with ecosystem maintenance and restoration endeavors.

More from Dave

Cleland, David, Keith Reynolds, Robert Vaughan, Barbara Schrader, Harbin Li and Larry Laing. 2017. Terrestrial Condition Assessment for National Forests of the USDA Forest Service in the Continental US. Sustainability 9(11):2144. 19pp. DOI:10.3390/su9112144.

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